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JOINT COUNCIL ON FOOD AND AGRICULTURAL SCIENCES

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SEP 29 '81

CURRENT SERIAL RECORDS

PROCEEDINGS OF THE JOINT COUNCIL ON FOOD AND AGRICULTURAL SCIENCES MEETING, APRIL 15-16, 1981 WASHINGTON, D.C.

Attendees:

Anson R. Bertrand, Cochairman
John S. Robins, Cochairman
A. R. Baldwin
Lawrence Bogorad
Robert E. Buckman
Lark P. Carter
Richard A. Farley
Kenneth R. Farrell
Raymond T. Floate
John L. Gerwig
Sumner Griffin
Mark Hegsted
R. J. Hildreth
Allan Johnson
John P. Jordan
Terry B. Kinney, Jr.
Richard D. Morrison
Susan M. Oace
Merrill L. Petoskey
Robert Lee Scarborough
Keith Shea
Richard A. Skok
George W. Sledge
Charles Smallwood
W. I. Thomas
John G. Stovall, Executive Director
Susan G. Schram, Executive Secretary

Others Present:

L. F. Amburn, National Extension Committee
Signe Betsinger, Chairman, North Central
Regional Council
Mark Buchanan, Western Director-at-Large,
State Agricultural Experiment Stations
Elmer Clark, Agricultural Experiment Station,
Logan, Utah
Melvin Cotner, USDA/ESS
K. Jane Coulter, USDA/SEA
Red Doering, USDA/SEA
Gary Evans, USDA/SEA
Paul Fischbach, University of Nebraska
Kennan Garvey, USDA/OBPE
Bruce Greenshields, USDA/ESS
Helen Guttman, USDA/SEA
George Holcomb, USDA/GPA
Marvin Jensen, USDA/SEA
Marva Jett, USDA/SEA
Allan Johnson, USDA/ESS
Doyle J. Matthews, Utah State University
Harold Owens, USDA/SEA
Gilbert Porter, Chairman, Northeast Regional
Council
Joseph Purcell, IR-6, Beltsville
Robert Reinsel, USDA/SEA
Keith Shea, USDA/FS
Marge Stanton, USDA/SEA
Donald Therriault, USDA/SEA
Frank Thomas, Water Resources Council
Paul Truitt, Agricultural Research Institute

1. Presiding Cochairmen: Anson R. Bertrand and John S. Robins.

2. Updates

- John Stovall, Executive Director, reported that the report Facilities for Food and Agricultural Research: Survey Results has been transmitted in its entirety by the Secretary of Agriculture to the President and Congress.
- The Single Most Needed Facility Study has also been completed. The Executive Committee requested that this report be duplicated and sent to primary constituencies who participated in the study, and selected interested parties on the Hill.
- Cochairman Robins reported that the Executive Committee had met with Secretary of Agriculture John Block on April 14 to discuss Joint Council issue papers delineating priority issues facing the food and agriculture science and education system. As a result of this meeting, the Secretary has invited the Council's Ad Hoc Committee on Energy to provide materials defining dimensions of programs that are now, or need to be, in place to meet agriculture's requirements for energy.
- Robins also informed the Council that the Executive Committee had reviewed its committee roster and had dismissed the following with thanks upon completion of their charge: Steering Committee for Planning and Coordination; Committee on Joint Council Strategies; Crop Losses Study Group.

3. The Proceedings of the February 18-20, 1981, joint meeting of the Joint Council and Users Advisory Board were approved.

4. Report of the Joint Council Agenda Committee

- J. P. Jordan, chairman, reported that, as requested at the February Joint Council meeting, the Agenda Committee had provided a more comprehensive description of priority issues chosen by the Council for emphasis in 1981.
- Jordan briefly reviewed descriptions of the following issues: Water; Energy; Productivity; Technology Transfer; Human Resources; Budgets for Research, Extension, and Teaching; Post-Harvest Technology, Marketing, and Export.
- Cochairman Robins advised the Council that the Executive Committee discussed the Agenda Committee report and has made the following

recommendations: (1) that a Joint Council standing Committee on Water be appointed to further pursue issues raised by the Agenda Committee; (2) that an author be identified to document the most important elements of Productivity, constraints on those elements, and recommendations for action that should be taken to enhance productivity in the future, and that a panel then be selected to review this document; (3) that the Regional Councils and National Committees be asked to place Technology Transfer, Human Resources, Budgets, and Post-Harvest Technology on their agendas for discussion for 1982. Specifically, the Executive Committee recommends referring (a) the Technology Transfer issue to the National Extension Committee; (b) Human Resources to the National Higher Education Committee; (c) Post-Harvest Technology, Marketing and Export to the National Agricultural Research Committee; (d) Budgets for science and education to all entities in the planning and coordination structure. Regional Councils will address these concerns across all three functions of teaching, research, and extension.

- The Council voted to accept the report of the Agenda Committee and the recommendations of the Executive Committee.

5. Planning and Coordination Discussion

Cochairman Robins introduced chairmen or respective representatives of Regional Councils and National Committees. He explained that the objective of this agenda item was to discuss roles of the various entities included in the Joint Council structure for planning and coordination and to explore possibilities for coordination in the Council's three priority areas of: water, energy, and agricultural productivity.

a. Gilbert Porter: Chairman, Northeast Regional Council

- Dr. Porter cited the following viewpoints shared at the January 14 meeting of the Northeast Regional Council: (1) that a budget is needed to finance the operation of Regional Councils and Regional Committees; (2) that the Northeast Council will proceed with its original plan, with functional planning committees operating under the aegis of the Regional Council; (3) that mutual cross-functional support is needed in the region and that the regional structure is a unique mechanism for accomplishing this.
- Porter also reviewed reports of the Northeast Regional Committees: (1) Education: sees an opportunity to expand their base for educational programs and "cross-fertilize" with extension and research programs; (2) Extension: hopes to promote increased understanding of linkages between teaching, research, and extension, especially among those not traditionally involved in

the land-grant system; (3) Research: has had a regional planning process in place for some time, but will expand and diversify the existing committee.

- Regarding status of planning and coordination activities in water, energy, and productivity, Porter informed the Council that: (1) the Northeast Regional Council has selected energy as its first major focus for improving planning and coordination efforts, and will likely move forward in this area through a multi-disciplinary task force; (2) water is at a lower range of the higher priorities of the Northeast Regional Council; (3) the Northeast Regional Research Committee has steering committees covering 10 commodity groups that account for 90 percent of the scientific staff-year effort in the region. Three additional steering committees are in the process of being formed. All regional research project proposals are reviewed by these committees. Porter sees a change in the relative competitive position of the Northeast in various types of agricultural productivity.

b. Signe Betsinger: Chairman, North Central Regional Council

Dr. Betsinger addressed coordination efforts in research, extension, and teaching in the areas of energy, agricultural productivity, and water in the North Central Region. She noted the following:

ENERGY - RESEARCH and EXTENSION EFFORTS

- There is a general feeling that coordination in the North Central region is moving in a positive direction in energy. There is good communication between researchers and a balance between singular efforts and those which duplicate, duplication being done only when it is needed to get the appropriate data.
- There is much coordination in the region; some would say it is over-coordinated. Two new North Central regional research committees have just been approved this month: NCT 130: Vegetable Oils as an Alternative Fuel for Diesel Engines and NCR 130: Alcohol Production and Utilization.
- North Central Cooperative Extension Services are strongly involved with energy programs. Coordination is excellent both within States and between States. Many States have special funds from State energy agencies and in two or three, the total funds come to Cooperative Extension. All four program areas in Cooperative Extension have regional standing committees. Each has dealt with energy in some way (such as holding regional meetings on energy for subject matter specialists).

- The Energy Center at Peoria has given leadership to specific energy issues. There is much activity at Peoria and while there are good coordinating efforts underway, there appear to be two areas which need improvement in the satellite structure:
(1) resolution of the funding mechanism and (2) full staffing of the centers.

AGRICULTURAL PRODUCTIVITY - RESEARCH and EXTENSION EFFORTS

- Coordination has been well demonstrated in recent years in the North Central region in the area of agricultural productivity. Excellent examples are Integrated Pest Management and Pesticide Impact Assessment where communication and program efforts have been well executed by research, extension, and teaching.
- One of the high priority concerns in the region is the status of productivity research, particularly basic research. Has the well run dry? Will there be scientists and funds to develop a major breakthrough? Coupled with this is the concern for extension funds. Research alone will not increase productivity -- extension is needed to teach current technology. Industry's research force and its educational services are important, as well as the contributions of publicly supported scientists and educators.
- A significant step toward the development of regional communication networks is the new computer information system which will create a regional information institute in Wisconsin. By utilizing hardware in each State, a retrieval system will be developed so that there will be a data base, training, and information exchange available. Ultimately, county offices and large farms all over the region will have terminals -- enhancing coordination of research, extension, and teaching.

WATER - RESEARCH and EXTENSION EFFORTS

- Critical reexamination is needed of the North Central Region's approach to water problems. Perhaps part of this is because the research base is weak and hence extension and teaching don't have the information. There appears to be a higher level of frustration associated with water than with energy. This may be attributed to the fact that water problems are more immediate and visible (unsafe water and shortages are here and now) while energy problems tend to be more future oriented. Perhaps coordination is less easily achieved because of the wide range in the nature of the water problems from State to State.

- Sophistication seems to be lacking in organizing sociologically and politically when it comes to water. Ben Jones, Assistant Director of the Agricultural Experiment Station, cites that there are 25 different drainage districts within one county in Illinois, each one with a separate legal entity with commissioners, subject to the circuit court. Added to this is the basic conception of what drainage is; it is one thing in Illinois and another in Ohio and Indiana. In Minnesota there are at least 16 different agencies, boards, and commissions each administering water programs!

ENERGY, AGRICULTURAL PRODUCTIVITY and WATER - TEACHING EFFORTS

- In the North Central Region, coordination between research and teaching is well articulated. Through joint appointments which combine research and teaching, the translation from laboratory to practice reaches the classroom.
- In some places, coordinating teaching with extension may be one step removed, but in the North Central region interchange between teaching and extension has been good when major issues were to be identified. In resident instruction, the topics of agricultural productivity and water management have been in existence for many years and have been integrated into ongoing courses. In energy, however, curriculum is being expanded to particularly highlight energy.
- RICOP regional identification of priorities relating to energy and crop production has been forwarded to the Joint Council. There is a keen awareness of the need to set priorities relating to training for agricultural expertise.
- In the North Central Region, the plan for the upcoming meeting is to seek ways in which the Regional Council can supplement rather than duplicate efforts made by the Joint Council in energy, agricultural productivity, and water by focusing on the development of human resources for the last of this century in relation to these issues.

c. Mark Buchanan: Cochairman, National Agricultural Research Committee

- Cochairman Buchanan noted that the NARC, at its April 14-15 meeting, had (1) finalized its charter; (2) changed the group's name from National Research Committee to National Agricultural Research Committee to avoid confusion with the National Research Council and clarify its mission; (3) decided to continue the regional/national projections report (to be completed in October)

and also to ask each Regional Agricultural Research Committee to determine 10-15 regional research program areas needing additional emphasis; (4) discussed technology assessment, specifically, the ongoing Technology Assessment of Corn (Sundquist, Minnesota) that will be overseen by the NARC in cooperation with the Joint Council Steering Committee on Technology Assessment.

- In the future, the committee hopes to focus on determining basic research requirements for increasing agricultural productivity and on achieving greater dialogue with USDA agencies in the budget process.
- Anticipated products of the NARC for 1981 include (1) its charter, (2) the annual research projections report, (3) regional projections publications, (4) other products to impact on the budget and increase communication within research.

d. Lark Carter: Secretary, National Higher Education Committee; and
Sumner Griffin: Member, NHEC

- Carter reported that the NHEC had held its initial meeting April 9, 1981. Edward Glazener, North Carolina State University, was elected chairman; R. G. Seals, University of Nevada, vice chairman; and Carter, secretary.
- The primary mission of the NHEC is to provide an organized voice for the diverse interests of higher education in food and agriculture.
- Two NHEC workgroups were formed: (1) Workgroup on Food and Agricultural Education Information System and (2) Workgroup on National Assessment of Curricula in the Food and Agricultural Sciences.
- Sumner Griffin highlighted other concerns expressed by the committee: (1) lack of budget support for higher education in the food and agricultural sciences; (2) need for greater cooperation and communication among research, extension, and teaching; (3) lack of career materials to encourage prospective students; (4) need for specialized training, internships, etc., computer training, training in leadership, speaking, writing; (5) issue of women and minorities in agriculture; (6) inadequate data base for higher education; (7) concern for the future of the Office of Higher Education in SEA as vital for communication and coordination.

e. L. F. Amburn: Chairman, National Extension Committee

- L. F. Amburn reported that the National Extension Committee of the Joint Council held its initial meeting April 10, 1981. The committee elected Amburn as chairman; Dan Pfannstiel, Texas A&M University, vice chairman; and Mary Nell Greenwood, SEA/Extension, secretary.
- Amburn noted concern for the number of advisory committees related to extension, stating that he currently serves on six of those committees at the county, State, and national level. In light of this, the National Extension Committee has agreed to evaluate its progress and effectiveness in one year.
- The National Extension Committee feels that little coordination is apparent in the areas of water, energy, and agricultural productivity. For example, in the area of agricultural productivity there is considerable duplication of effort between Extension and the Environmental Protection Agency in certification of pesticide applicants.
- The Committee believes that duplication is a result of lack of coordination at the Federal level, but that some coordination develops around problem areas.
- The National Extension Committee will place special emphasis on the development of regionalized computer delivery systems. They also see opportunities in the field of weather reporting and hope to promote 4-H and Home Economics Extension programs to a greater extent.
- Amburn appointed three subcommittees to do the following:
 - (a) Develop a statement for the Joint Council on computer technology, programs and use (chaired by Lowell Watts).
 - (b) Audit and inventory what has happened with changes in energy funding, including successes and failures of the past and strategies for the future (Leigh Hammond, chairman).
 - (c) Assess adequacy of existing research base for current and future extension programming. (Target areas are: public policy education, energy, computer technology, water, etc.) James Summers is chairman of this group.

- The next meeting of the National Extension Committee will be held June 18-19 in Kansas City, Missouri.

f. Response of Official "Reactors": R. J. Hildreth; J. P. Jordan; R. L. Scarborough

- R. J. Hildreth suggested that this type of discussion/interaction between entities in the Council's structure for planning and coordination is productive and should be continued on a regular basis; that the report of the Joint Council Agenda Committee will help bring key issues to the attention of the Regional Councils and National Committees; and that economic measures be taken (conference calls, meeting in conjunction with other functions, etc.) to hold down the cost of operating the Council's planning and coordination structure.
- J. P. Jordan suggested zeroing in on one or two topics at the Regional Council level (topics may vary from region to region) and doing an outstanding job in a fewer amount of subject matter areas.
- R. L. Scarborough stated that he is supportive of the planning structure that the Council has developed, but we must now determine how the entities in that structure are going to interact with one another and how a balance will be kept among activities in teaching, research, and extension. He supports increased use of computers as an aid to farmers.

g. General Discussion/Questions

- Discussion indicated a need for more future-oriented organization within the Joint Council's planning structure, with longer lead time provided by the Council to obtain regional input.
- Further guidance was sought by Regional Councils and National Committees regarding their role vis-a-vis the Joint Council, but Cochairman Bertrand indicated that the Council look to its National Committees and Regional Councils and committees for leadership in this area.
- R. J. Hildreth reminded members that the Council was not intended to be a top-down structure; hence, role descriptions of various units in the structure may currently be rather fuzzy.
- T. B. Kinney suggested that the Joint Council might define what needs to be done (i.e., desired products) and then let the

regional structure design processes to accomplish these objectives.

- Regional Council and National Committee chairmen indicated that budget and staff support would greatly enhance their functioning. They also requested that Joint Council members attend their meetings with reasonable frequency to increase communication.
- Cochairman Robins encouraged the Council to put in place better mechanisms for looking at budgets. He recommended greater linkage between the planning and budget-making process.

6. AR Representation on National Agricultural Research Committee

- Cochairman Robins reviewed correspondence from the Northeast Regional Association of Experiment Station Directors recommending that two additional SEA/Agricultural Research representatives serve on the National Agricultural Research Committee.
- NARC Cochairman Buchanan indicated that the NARC favored this addition to its membership.
- Following discussion, Cochairman Robins declared consensus supporting the addition of two more SEA/AR representatives to the NARC.

7. Water Resources Symposium

Cochairman Bertrand noted that both the Joint Council and the Users Advisory Board had identified the area of Water Resources for Agriculture as their top priority for 1981, and that the objective of this symposium was to get a better understanding of the issues, problems and opportunities with respect to food and agricultural science and education.

a. Water for Agriculture

- Frank Thomas, U. S. Water Resources Council, noted changing trends in thinking, philosophy, and management concerning water, with increased emphasis being placed on cost recovery of Federal investment (through user charges, etc.), greater non-Federal participation, and a switch from emphasis on demand to supply augmentation.
- The 1975 National Water Assessment shows that the United States has an ample supply of water from both surface and underground sources. However, local or regional inadequacy of supply is

resulting from uneven distribution of precipitation, poor quality of water, or economic-social-environmental constraints. Groundwater accounts for approximately one-third of fresh-water use.

- Instream use of water for fish and wildlife, hydroelectric generation, navigation, and recreation is estimated to require at least 60 percent of the total streamflow in all regions east of the Mississippi River and in most regions west of the Mississippi River.
- Offstream use of water amounted to 338 Billion Gallons Per Day (BGD) of freshwater withdrawn from surface and ground sources of which 107 BGD was consumed or removed from the immediate water supply. By 2000, withdrawals are expected to decline by 9 percent as the result of conservation practices, but consumption is expected to increase by 27 percent as a result of growth by user industries.
- In 1975, agriculture accounted for 48 percent of total water withdrawals and 83 percent of total consumption. By the year 2000 these percentages will be 51 and 70 percent, respectively. Reduced consumption by agriculture is the result of increased demand for manufacturing and steam electric consumption.
- Regionally, agriculture is the dominant water use west of the 100th meridian, in the Lower Mississippi Valley, and in Florida. Irrigation accounts for more than 90 percent of all agricultural water use. Livestock and rural water supply are relatively minor uses.
- Patterns of surface and groundwater use closely follow irrigation patterns. Severe surface water problems exist in the Rio Grande, lower Colorado, and southern California regions. Severe groundwater problems exist in the southern Arizona, Ogallala, Georgia, Great Basin, and lower Colorado regions.
- While data from the assessment focus attention on problem areas associated with irrigated agriculture in the West, there are significant local problems throughout the Nation and in the more humid areas groundwater drawdown, subsidence, and the degradation of water quality by agricultural chemicals are major problems.

b. State of Research in Agricultural Water Resources

- Marvin E. Jensen, National Research Program Leader, Water Management, SEA/AR, explained that diminishing water supplies

for agriculture and degradation of water quality have increased concerns about water research programs.

- Availability of technology, groundwater supplies, greater recognition of water as a production-limiting resource, and desire to reduce crop investment risk have spurred irrigation development in semiarid, subhumid, and humid areas which has increased water consumption.
- The Office of Science and Technology Policy and the Office of Water Research and Technology have coordinated the compilation of all current Federal water resources-related research programs in 1980 as part of a Five-Year Plan. A National Research Council Committee also is developing a list of water resources research priorities which should be available in May 1981, and GAO currently is preparing a report on water resources research activities. The GAO report is expected to address the relative investments in research and development, relative to potential benefits.
- An example of new technology being developed to enable farmers to make more effective use of limited water supplies is the Limited Irrigation/Dryland (LID) farming system developed for the Southern Great Plains. The LID system, which combines the best of both irrigation and dryland practices, has produced twice the grain sorghum per unit of irrigation water pumped compared with conventional irrigation practices.
- The water issue has been given increased attention in the recent past. Emerging issues affecting agricultural water supplies have been described in the comprehensive 1978 Second National Water Assessment. Major news magazines and network television have given increased visibility to emerging water problems. A February 1981 National Workshop sponsored by 10 societies and numerous agencies on national soil and water resources priorities identified the following major water research needs: (1) developing conservation technology; (2) managing water in stressed environments; (3) protecting water quality; (4) improving and implementing conservation policy; and (5) assessing soil and water resources. Seven of the nine panels also identified water resources research priorities.
- Some emerging technical issues that the Joint Council should consider are: (1) diminishing water supplies for agriculture, especially in arid and semiarid areas (our current production level is dependent on groundwater mining); (2) sharply increasing costs for energy to lift water from its original

source and provide pressure to apply it with sprinklers;
(3) increasing competition for available water supplies, particularly for energy production and instream uses;
(4) degradation of quality of water available for agriculture; and (5) more effective control of drainage to avoid overdrainage in the sandy soils of the Southeast Coastal Plains and associated groundwater overdraft due to increased irrigation.

c. State of Research in Agricultural Water Resources (Stateside)

- Doyle Matthews, Dean, College of Agriculture, Utah State University, explained that the orientation of his remarks would be to the West, with comments pertaining to other regions.
- The printed report distributed outlines a broadly derived consensus of water problems needing research attention and where that research attention is being given. The close correlation between needs and actual projects should be noted. The correlation is due to the system which provides a Federal and State cooperative approach in addressing local and national research problems.
- Through USDA-SEA, Congress appropriates funds by formula to States willing to coordinate planning, priority setting, and research project development. That fundamental system is the coordinating vehicle for research both within and without the system. When the scientists (both State and Federal) become closely acquainted and learn to work together, coordination takes place.
- The federally sponsored regional research effort is the most effective instrument to foster research coordination and is essential in systematizing the Federal and State efforts in agricultural research. From time to time there has been concern that the Federal aspect of the cooperative research marriage has been faltering. The Western Region knows nothing that can take its place.
- Matthews feels that in no researchable area is the Federal-State cooperative approach more vital than in the area of water. The highest stakes in the West will be played over water. In the arid West, water is a premium commodity and will be subject to increasing pressures in the future. Even the more humid sections of the United States are beginning to feel the pressures of development on finite water supplies.

- More population, which seems to be inevitable, means increased need for water to drink, to use in industrial processes, and to produce food. Water supply in the arid West is inadequate to meet demands from all users.
- All water research has the general objective of increasing the utility of water. Nowhere is conservation for conservation's sake an objective. If conservation in an ecological sense is espoused, it is really referring to preserving water from one use for another. Water being used for agriculture must be conserved for providing fish habitat, for example.
- Where efforts are made to improve irrigation efficiency, the objective is to use, to repeat use, and then use again for some other purpose. Concern with salinity and reduced volume of water because of consumptive use of water in agriculture is based on the reduced utility occasioned by these factors. Neither research nor lawsuits create water.
- The water supply in any area is finite, and research is basically directed toward providing data on which resource allocations can be made. In the West, at the present time, energy development is looking with longing eyes and bulging checkbooks on the use of water for marginally profitable food production. Water follows the laws of nature; it flows downhill and toward money!
- The top six regional research priorities in the West include:
 - (1) legal/institutional aspects of allocation of newly quantified water supplies and reallocation of existing supplies;
 - (2) conjunctive management of surface and ground waters;
 - (3) contamination of ground and surface waters by heavy metals, organics and other toxic materials;
 - (4) processes of salt pickup in surface waters and movement through channels and reservoirs for use in more effective water management and methods of salinity control;
 - (5) effects of mining activity (metals, fossil fuels and others) on surface runoff, water quality, and groundwater movement and quality;
 - (6) use of brackish and saline waters in the cultivation and processing of agricultural crops for synthetic rubber production.

d. Technology Transfer Programs in Water Resources

- Paul Fischbach, Extension Irrigation Specialist, University of Nebraska, cited the following problems related to water for agriculture:

- There are approximately 61 million acres irrigated in the U. S. In Nebraska, over 7 million acres are irrigated, of which 85 percent is from the groundwater reservoir. The remaining 15 percent is from streams and surface reservoirs. At present, the on-farm water application efficiency is about 50 percent. Research has shown that water application efficiencies could reach 85 percent provided the proper irrigation system was selected for the soil and slope conditions (site specific) and the newest operational technology is adopted.
- Soil erosion by water and subsequent sedimentation has been identified as a major water quality problem in many areas of the country. Unfortunately, approximately 75 percent of Nebraska's estimated 113,310,000 tons of annual erosion is from row crop production acres.
- The concentration of nitrate-nitrogen has greatly increased in the groundwater reservoir over the past 20 years in Nebraska. The water quality survey taken in 1961 showed only a few irrigation wells pumping water over 10 p.p.m. nitrate-nitrogen; however, the 1980 survey shows the irrigation wells in several counties are pumping water averaging about 20 p.p.m. nitrate-nitrogen. This represents an economic loss and also may be a health hazard to children under 6 months of age.
- Pumping plant efficiency tests (457 tests) show that the average pumping plant is using 30 percent more energy than is needed according to the Nebraska Performance Criteria. Nine percent of the pumping plants are using more than twice as much energy as needed. Pump and/or engine adjustment reduce energy requirements 10 percent in 50 percent of the cases. In addition, 25 percent need new pumps, gear heads and/or power plants.
- Fischbach gave the following examples of technology transfer programs for solutions to these problems:
 - Increasing On-Farm Irrigated Water Application Efficiency

(1) Auto-Surface Irrigation

From the energy, water savings and pollution aspects, a renewed effort in the Automation of Surface Irrigation including surge flow is needed. The Automated Surface Irrigation with a reuse system is the most energy

efficient method of irrigation. If the automated gated pipe (surface) system is designed and operated properly, water application efficiencies can reach 92 percent.

(2) Reuse System

The installation of reuse systems can save 15 to 25 percent of the water. These are especially needed when groundwater is the source of supply.

(3) Reduced Pressure for Center Pivot

A technology transfer program is needed to assist irrigators in selecting the proper pressure for their center pivot sprinkler systems. Reduced pressure may appear to reduce energy needed; however, water application efficiency on slopes and many soils may decrease, resulting in more energy used to accomplish the needed irrigation or drastic reduction of crop yields. About 25 percent of the energy could be saved; no savings in water or pollution control.

(4) Irrigation Scheduling

Irrigation scheduling is applying the right amount of water at the right time. Research has made excellent technology available to schedule irrigations. It involves weather factors, crop coefficients, and soil moisture monitoring. Pilot projects in Nebraska show a 35 percent savings in water, 35 percent savings in energy and 25 percent savings in nitrogen fertilizer application. Irrigation scheduling is important in all States west of the Mississippi River. In addition, Georgia, Alabama, Florida, North and South Carolina have greatly increased their irrigated acreages.

- Conservation Tillage Systems

Residue management through the use of conservation tillage systems is currently the most cost-effective method of reducing soil erosion. Nebraska research indicates that no-till planting systems can reduce soil erosion by about 90 percent compared to a mold board plow system. Use of conservation tillage also conserves 50 to 70 percent of the energy, 30 to 50 percent of the labor, in addition to the conservation of moisture and soil nutrients.

- Increasing Irrigation Pumping Plant Efficiency

Some causes of low efficiencies include: pumping water levels changing over time, components wearing out or irrigators changing systems. A procedure has been developed to test, evaluate and diagnose the problem. Consequently, irrigators and consultants need to be educated and trained in testing, evaluating and adjusting the pumping plant. Many irrigators not only want to be trained but also need the loan of testing equipment for a short period of time. There is a potential of saving 50 million gallons of diesel fuel equivalents in Nebraska alone. Pumped water for irrigation out of groundwater reservoirs represents nearly 90 percent of the acreage in Nebraska.

- Fischbach suggested the following teaching methods as part of a technology transfer program to motivate people to adopt new practices: (1) television, radio; (2) pilot projects; (3) short courses; (4) State and district workshops; (5) county and local meetings; (6) teaching materials such as fact sheets, bulletins, slide tapes, videotapes, computer programs, and handbooks.

e. Emerging Technical and Policy Issues

- Melvin Cotner, Director, Natural Resource Economics Division, ESS, shared the following highlights:
 - Twelve percent of harvested acreage is irrigated. This acreage contributes 27 percent of the value of production.
 - Irrigation facilities exist on 56 million acres; 20 percent of the irrigated land is in hay and pasture crops, an acreage that possibly could be devoted to more intensive crops.
 - Irrigated land increased 2 1/2 million acres per year between 1974 and 1978.
 - Groundwater mining is most critical in the Central Plains (Ogalalla aquifer) and is serious in Texas, Arizona, Utah and Nevada.
 - Agriculture withdraws less water from streams and aquifers than municipalities and industry; but agriculture actually consumes more water thereby returns a smaller percentage for reuse.
 - Irrigation efficiency (measured as the ratio of water actually consumed over water delivered to the farm) is below

65 percent in most of the Western 17 States; Nevada, Wyoming, Idaho and parts of Oregon, Arizona and New Mexico have irrigation efficiencies below 45 percent.

- Opportunities to increase on-farm irrigation efficiencies vary from 10 to 19 percent in the West.
- Hydrologic surpluses of water exist in the Eastern and Northwest parts of the U. S.; the Southwest utilizes most of its surface flows; opportunities for transbasin diversions exist but are costly.
- The North Central Region of the U. S. has the largest concentration of sediment movement in watersheds; this area also has the highest rates of fertilizer, insecticide and herbicide use.
- Acid precipitation has increased markedly in the Eastern U. S., including Canada.
- Federal funding for soil and water conservation programs in real terms has been constant since 1950.
- Technical issues concerning water focus mainly on the effective and efficient use of existing supplies. These issues encompass conveyance and storage practices, application technology, irrigation scheduling, cropping systems and on-farm as well as watershed or river basin systems to manage nutrient use, water use and pollutants.
- While considerable data exist on water issues and problems, still little information exists on the investments by the private sector in the types and kinds of water-use practices. Additional information is needed on water use, especially groundwater.
- Policy issues relate primarily to programs that deal with social and economic dimensions of water use, especially issues relating to the long-term interests of society. These issues include water pricing and conservation, groundwater management, conjunctive use of surface and groundwater, and competing water uses.
- Inadequate water research planning and coordination are concerns expressed by the General Accounting Office and others. The Water Resources Council and the Office of Science and Technology Policy could facilitate planning coordination. Should the Joint Council be involved?

f. Summary

- In summary, Cochairman Robins noted that there has been a plethora of planning, studies, assessment, and evaluation on the subject of water at the State and Federal levels. There has also been much coordination within States, between States, and with the USDA, particularly in the West.
- The overall data base on this subject needs improvement so that an overview of programs can be obtained.
- Robins feels that increased cognizance must be taken of the political, economic, and legal dimensions of this issue in the science and education community. We must look at the socioeconomic consequences of a diminishing water supply.
- The Joint Council should continue to keep this issue visible and to keep the relationship between the action, research, and education agencies functioning through its regional/national planning and coordination structure.

g. Discussion/Conclusion

- L. Bogorad requested that resource persons identify the major water research opportunities at this time. The following opportunities were cited: (1) improvement of management techniques; (2) improvement of water-use efficiency in agriculture; (3) increased extension funding in this area to stimulate technology transfer; (4) additional research on technical and policy issues.
- Cochairman Robins revealed that the Executive Committee, per Agenda Committee recommendation, suggests the Council appoint a standing Committee on Water.
- It was moved, seconded and passed that such a committee be appointed to address water resources issues as they relate to agriculture.

8. Report from the National Agricultural Research and Extension Users Advisory Board

- Robert Lee Scarborough reported that the UAB met April 6-8 in College Station, Texas.
- The Board identified four issues for intensive board/staff work this year and established the following task groups to report at the July

meeting: (1) Budget, (2) Cooperative Extension Programs, (3) Resource Conservation, and (4) Animal Productivity.

- The Board also heard in-depth reports on Texas programs in water and integrated pest management.
- The Board has corresponded with the Joint Council requesting "criteria" that are used by research and extension managers to determine when programs are of adequate scale.
- Cochairman Robins explained that the Executive Committee will respond to this request.

9. Update: Program Structure

- George Sledge, chairman, Program Structure Study Group, reported that progress is being made in the following areas: (1) evaluating more fully the information requirements of various users and refining proposed program categories (including definition and information content) to reflect these requirements; (2) reexamining specific data characteristic requirements of the Joint Council (per February Joint Council meeting comments); (3) examining specific data contents of separate information systems already in existence (PARIS and CRIS), those being modified (EMIS), and those proposed to be established (HENAPS) to determine data already available for an integrated system, and what additional data will be required of the separate information systems; (4) developing more fully the concept of an integrated information system and the cost of its implementation.
- The Program Structure Study Group will submit a report to the Council at its July meeting that will include a plan of what needs to be done, by whom, and estimated cost.

10. Report of the Joint Council Ad Hoc Committee on Energy

- J. P. Jordan, chairman, reviewed a final summary of the October Energy Coordinating Conference and reported on the April 8 telephone conference of the committee.
- A chief concern of this committee is USDA's position relative to agricultural energy programs housed within the Department of Energy, as such programs are dismantled or moved.
- By mid-May, the Energy Committee will provide materials for the Secretary of Agriculture describing programs that are now, or need to be in place to meet agriculture's requirements for energy.

- The committee is also concerned that the various versions of the farm bill do not address energy. They will recommend that the Secretary correct this situation through the amendment process.

11. Report of the Study Group on the Participation of Women in the Food and Agricultural Sciences

- Jane Coulter, chairman, reported that the study group had completed its charge of "identifying issues related to the participation of women in the food and agricultural sciences which are within the purview of the Joint Council and on which the Council can assist the partners in the science and education system to find solutions."
- Marva Jett, SEA/EE0, who served as staff resource to the group, shared a statistical fact sheet concerning women in science and engineering. These statistics show that women remain markedly underrepresented in the federally employed science and engineering labor force and concentrated in the lower GS grades.
- In 1978, women constituted only one in thirteen of the federally employed scientists and engineers. While 45.2 percent of male scientists were in grade GS 13 or above, 21.3 percent of women scientists were in that grade range.
- Statistics also reveal significant salary differentials. For example, male scientists and engineers in the Federal service earned 25 percent more than females in comparable positions in 1977. Salary differentials ranged from 18 percent for life scientists to 33 percent for physical scientists.
- Coulter reported that issues of concern cited by the study group were primarily in the areas of enrollment and employment. She delineated the committee's priorities in these two areas.
- The study group made the following final recommendations: (1) that a standing committee on women's issues be established by the Joint Council or the name and function of the standing Committee on Minority Affairs be amended to reflect concern for women in the food and agricultural sciences comparable to the concern expressed for minorities in the food and agricultural sciences; (2) that enrollment and employment issues recommended by the study group should serve as a basis for action by the Joint Council to improve the participation of women in the food and agricultural sciences; (3) that the Joint Council should continue to assert the need for graduate fellowships to the Department and to the Congress for the purpose of recruiting and training the professional expertise (particularly among women and minorities) needed to meet the employment needs of the food and agricultural system.

- A lengthy discussion followed, with Council members suggesting a need to define the problem more closely and to collect additional national data to reveal its root causes.
- Coulter and Jett indicated that several studies are already available and show similar data. Also, many causes of problems relating to the participation of women in the food and agricultural sciences are not likely to surface through further statistical study.
- Several members suggested that the report should be seen as an opportunity to add to the pool of human resources for the food and agricultural sciences.
- It was moved, seconded and passed that the report of the study group be referred to the Joint Council Committee on Minority Affairs to determine: (1) where this particular issue fits in its overall list of priorities and when they anticipate addressing these concerns; (2) if there are additional constituency groups that should be added to the committee in order to deal effectively with these issues; and (3) views of the committee on action the Joint Council might take to alleviate some of the problems identified.

12. Update: Title XIV

- John Stovall, Executive Director, compared the various versions of the Farm Bill that have been introduced in the House and Senate (Wampler - H.R. 2561; Helms - S. 884; Helms - S. 943 -- administration bill; Huddleston - S. 994).
- All of the proposed bills extend the authority for agricultural teaching, research and extension activities for four more years; establish an Assistant Secretary for research, extension and teaching in USDA; clarify and emphasize the USDA/State partnership; and require that 25 percent of the total agricultural research budget in SEA be through the Hatch formula funding mechanism.
- The Wampler bill increases Extension 1890 funding from 4 percent to 7 percent of Smith-Lever funds; contains an additional section on aquaculture; and authorizes a rangeland research program.
- In the Higher Education area, the administration bill maintains language of the 1977 Farm Bill; the Wampler and Huddleston bills provide for additional competitive grants for innovative educational programs; and some of the bills transfer the administration of the Bankhead-Jones Act to the USDA from the Department of Education.
- All bills extend the Users Advisory Board for four more years and increase the number of producers on the UAB from four to eight.

- All bills extend the Joint Council through 1986 and require that the Council have not fewer than 25 members. The administration and Wampler bills require that at least 50 percent of the Council's membership be from land-grant institutions and that planning should be accomplished through "existing organizations and agencies whenever possible."
 - The Wampler bill specifies that at least two of the other representatives are from "other colleges having a demonstrated capacity to carry out food and agricultural research, extension, or teaching."
 - The Wampler bill requires the Joint Council submit three reports annually: (1) June 30 - Priorities in Research, Extension, Teaching, including funding recommendations; (2) November 30 - Annual Report; (3) June 30 - Five-Year Plan (required every two years).
 - All bills provide for a full time Executive Director for the Joint Council and Users Advisory Board and a full time professional staff of not more than five persons and exempt the Council from the Federal Advisory Committee Act.
 - A comparative summary of all bills will be sent to Council members.
13. The Council expressed hearty thanks and presented Certificates of Appreciation to John S. Robins for ably serving as Cochairman of the Joint Council for the past three years, and to Richard Morrison for effectively representing 1890 Institutions.
14. The next meeting of the Council will be held July 15-17 at the Key Bridge Marriott Hotel in Rosslyn, Virginia.

